

**TRANSLATION**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>BCT040216/EN</b>	<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. <b>PCT/FR2004/003400</b>	International filing date ( <i>day/month/year</i> ) <b>28.12.2004</b>	Priority date ( <i>day/month/year</i> ) <b>31.12.2003</b>
International Patent Classification (IPC) or national classification and IPC <b>F02B3/02, F02B23/10, F02B25/14</b>		
Applicant <b>MAGNETI MARELLI MOTOPROPULSION FRANCE SAS</b>		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising: a. <input checked="" type="checkbox"/> ( <i>sent to the applicant and to the International Bureau</i> ) a total of <u>2</u> sheets, as follows: <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. <input type="checkbox"/> ( <i>sent to the International Bureau only</i> ) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items: <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FR2004/003400

Box No. I

Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-19 as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. 2, 3 as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* 1 received by this Authority on 29.03.2006 with telefax
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- sheets 1-6 as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FR2004/003400

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	<u>1-3</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-3</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-3</u>	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
Reference is made to the following document:			
D1: US-B1-6 508 225 (HIKI KEIICHI) 21 January 2003 (2003-01-21)			
1.1	<p>D1 describes (cf. column 12, line 5 to column 13, line 47, figures 1 to 5) a direct injection two-stroke engine that includes a combustion chamber (248) delimited by a cylinder (111), which has a longitudinal axis (243) and is provided with at least one inlet port (246) and at least one exhaust port (244); a piston (252) that has a substantially planar base (254) and is moved along the longitudinal axis (243) by a connecting rod coupled to a crankshaft; a cylinder head (112) provided with a spark plug (238) and an injector (162) capable of spraying a jet of pressurised liquid fuel into the combustion chamber (248) along a spraying axis such that the fuel jet has a spray angle between 15 ° and 75 ° (45 ° and 70 °); wherein the combustion chamber (248) has a first diametrical plane that includes the longitudinal axis (243) of the cylinder (11) and is centred on the exhaust port (244), and a second diametrical plane perpendicular to said first diametrical plane; the spark plug (238) is located in a</p>		

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
	<p>first portion of the cylinder head (112) that extends from the second diametrical plane towards the inlet port (246); the injector (162) is mounted in a bore of the cylinder head oriented according to an axis and located on the first diametrical plane on a second portion of the cylinder head (112) complementary to the first portion; and the spray angle forms a first angle measured relative to a transverse plane of the cylinder, which is between 30 ° and 70 ° (implicit; cf. figure 5), and a second angle measured relative to the first diametrical plane, which is between + 45 ° and - 45 ° (0 °).</p> <p>1.2 The subject matter of claim 1 therefore differs from this known engine in that:</p> <ul style="list-style-type: none"><li>- the cubic capacity of the engine does not exceed 125 cm<sup>3</sup>;</li><li>- the spray axis forms a non-zero angle with said axis of the cylinder head bore:</li><li>- a control device is provided for controlling the start of fuel injection when the crankshaft is in an angular position between 45 ° and 20 ° before the angular position in which the exhaust port is closed;</li><li>- the fuel injection pressure and the orientation of the spray axis are determined according to the circulation of the gases in the combustion chamber so as to obtain a substantially stoichiometric mixture in the region of the spark plug when ignition takes place.</li></ul> <p>The subject matter of <b>claim 1</b> is therefore <b>novel</b> (PCT</p>

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
	<p>Article 33(2)).</p> <p>1.3 The problem that the present invention is intended to solve can be considered to be that of reducing the fuel consumption and the emission of pollutants of existing two-stroke engines while retaining the structure thereof.</p> <p>1.4 The solution to this problem, as proposed in <b>claim 1</b> of the present application, is considered to <b>involve an inventive step</b> (PCT Article 33(3)) since no prior art document proposes the use of the special features of claim 1 for the same purpose.</p> <p>1.5 <b>Claims 2 and 3</b> are dependent on claim 1 and thus also comply, as such, with the PCT requirements of novelty and inventive step.</p>